Global transport outlook to 2050
Targets and scenarios for a low-carbon transport sector

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- ETP 2012 analysis
  - Transport sector outlooks
  - CO₂ mitigation potential
  - Costing out the scenarios
- Transport technology outlooks and needs
  - Global Fuel Economy Initiative (GFEI)
  - Electric Vehicles Initiative (EVI)
  - Mobility modeling
- Conclusions
IEA Mobility Model (MoMo)

- Simulation of global transport energy use, emissions and materials use and costs
  - Multiple scenarios and projections to 2050
  - Applied hypotheses on GDP and population growth, travel demand, vehicle technologies and fuel shares, techno-economic parameters (e.g. fuel economy and cost)

- 29 regions (continued expansion)

- Significant data on technologies and fuel pathways
  - Full evaluation of GHG emissions life cycle
  - Cost valuation: vehicles, fuels, infrastructure
  - Section on material requirements for LDV manufacturing
Coverage of transport modes

- 2-3 wheelers
- Light duty vehicles
  - internal combustion
  - hybrids / plug-in hybrids
  - fuel cell vehicles
  - electric vehicles
- Heavy duty vehicles
  - passenger (minibuses, buses, BRT and intercity buses)
  - freight (medium and heavy trucks)
- Rail
  - passenger and freight
  - HSR (added in 2012)
- Air / Water transport
ETP 2012

Scenarios to 2050

- **6°C (6DS):** business-as-usual scenario, no further uptake of energy/climate policy
- **4°C (4DS):** expected ‘normal’ scenario, incorporating announced policies
- **2°C (2DS):** pathways to a clean energy system
World transport energy use has doubled in past 30 years

Light-duty vehicles continue to drive growth, while road freight and air travel also increased rapidly in last decade.
With no dedicated policies, road travel likely to double by 2050, with most growth coming from passenger light-duty vehicles in developing countries.
Energy use could increase as much as 70% by 2050 if no further policies are adopted in support of efficiency, alternative vehicles/fuels and modal shifting.
Efficient vehicles and alternative fuels key to achieve 2DS

An ‘avoid, shift and improve’ approach is the most cost effective to reach 2DS objectives
The 2DS ‘avoid, shift and improve’ scenario has potential to reduce global transport expenditures by as much as USD 70 trillion (~15% over 4DS).
Technologies for transport

Outlooks, needs and IEA initiatives
Transport technologies in the 2DS

Share of alternative vehicle technologies in 2010

Alternative vehicles still represent a small share of total LDV stocks.
In order to reach 2DS objectives, sales of non-conventional vehicles and fuels need to increase rapidly beyond 2015.
GFEI: status and potentials

Fuel economy readiness index status

Map showing the status of fuel economy readiness index across different countries.
GFEI: status and potentials

- Significant fuel economy improvement if policies are in place
- Size shift vs. technology evolution moderates Non-OECD improvement
- Growth of markets with worse fuel economy affects global trend
GFEI: status and potentials

Fuel economy potentials and costs

Note: Fuel savings over the lifetime of the vehicle are calculated based on 150,000 kms, for a base fuel economy of 8L/100km, with a fuel price of EUR 1 per litre (USD 4.7 per gallon), with no rebound effect as fuel economy improves.
Electric vehicles: realities and targets

EV vehicle sales need to double every year to reach 2020 targets.
Mobility trends and potential

Passenger mode share estimates (2009)

Modal data is limited in most countries but is critical to analysis of transport sector trends and potentials.
ETP ‘Avoid/Shift’ analysis demonstrates the potential to reduce energy and emissions to 2050 through marginal changes in travel.
Travel under the 4DS and 2DS is expected to increase road occupancy levels. Technologies could play a role in improving travel flows – and consequently reduce energy losses, emissions and social costs.
Looking forward

Technical questions and areas of needed research
Next steps and R&D needs

- Improved mobility requires understanding of mobility needs:
  - How do/will/could people and goods move about?
  - How can efficiencies be improved?
  - How can technology assist travel choices and movement?
  - How will urban context change transport needs?

- Transport system is complex:
  - One solution not a panacea – multiple approaches needed: infrastructure/technology/policy interface
  - Need to think outside the box from within the box – define solutions through innovation for context
Conclusions

- ‘Avoid, shift and improve’ approach most cost effective to achieve 2DS objectives
- Significant energy savings and emissions reduction possible through fuel economy improvement. Learning curves, costs and availability are key.
- Modal shifts can play large role in improving transport sector (costs, energy, emissions, time, etc)
- Technology priorities should address how to move people and goods efficiently in an energy-, time- and budget- constrained world
Thank you!

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